Claims

1. A semiconductor device, comprising:

a semiconductor chip which has a main surface and a back surface which are mutually located in an opposite side, and a plurality of electrode pads arranged over the main surface;

a capacitative element which has a first and a second electrode;

a supporting body which has a main surface and a back surface which are mutually located in an opposite side;

a plurality of leads arranged around the supporting body;

a plurality of bonding wires which connect electrically the electrode pads of the semiconductor chip, and the leads; and

a resin sealing body which seals the semiconductor chip, the capacitative element, the supporting body, the leads, and the bonding wires;

wherein

the leads extend and exist continuing in and out of the resin sealing body;

the semiconductor chip is adhered over the main surface of the supporting body; and

the capacitative element is adhered over the back surface of the supporting body.

2. A semiconductor device, comprising:

a semiconductor chip which has a main surface and a back surface which are mutually located in an opposite side, and a controlling circuit and a plurality of electrode pads which have been arranged in the main surface;

a capacitative element which has a first and a second electrode;

a first supporting body that has a main surface and a back surface which are mutually located in an opposite side;

a second supporting body that is the second supporting body arranged around the first supporting body, and has a main surface and a

back surface which are mutually located in an opposite side, and with which the main surface is located in a same side as the main surface of the first supporting body in a thickness direction of the first supporting body;

a plurality of leads arranged around the first supporting body;

a plurality of bonding wires which connect electrically the electrode pads of the semiconductor chip, and the leads, and the main surface of the second supporting body; and

a resin sealing body which seals the semiconductor chip, the capacitative element, the first and the second supporting body, the leads, and the bonding wires;

wherein

the leads extend and exist continuing in and out of the resin sealing body;

the semiconductor chip is adhered over the main surface of the first supporting body;

the first electrode of the capacitative element is adhered over the back surface of the first supporting body; and

the second electrode of the capacitative element is adhered over the back surface of the second supporting body.

3. A semiconductor device, comprising:

a semiconductor chip which has a main surface and a back surface which are mutually located in an opposite side, and a controlling circuit and a plurality of electrode pads which have been arranged in the main surface;

a capacitative element which has a first and a second electrode;

a first supporting body that has a main surface and a back surface which are mutually located in an opposite side;

a second supporting body that is the second supporting body arranged around the first supporting body, and has a main surface and a back surface which are mutually located in an opposite side and with which the main surface is located in a same side as the main surface of the first

supporting body in a thickness direction of the first supporting body;

a wire connecting part which is arranged around the first supporting body and connects with the first supporting body;

a plurality of leads arranged around the first supporting body;

a plurality of bonding wires which connect electrically the electrode pads of the semiconductor chip, and the leads, the wire connecting part and the main surface of the second supporting body; and

a resin sealing body which seals the semiconductor chip, the capacitative element, the first and the second supporting body, the wire connecting part, the leads, and the bonding wires;

wherein

the leads extend and exist continuing in and out of the resin sealing body;

the semiconductor chip is adhered over the main surface of the first supporting body;

the first electrode of the capacitative element is adhered over the back surface of the first supporting body; and

the second electrode of the capacitative element is adhered over the back surface of the second supporting body.

4. A semiconductor device according to any one of claims 1-3, wherein

the resin sealing body has an upper surface, an under surface, and a side surface; and

the leads have a first lead that projects from the under surface of the resin sealing body, and a second lead that projects from the upper surface of the resin sealing body.

5. A semiconductor device according to claim 4, wherein

the first and the second lead has an inner part located in an inside of the resin sealing body, and an outer part located in an outside of the resin sealing body;

the outer part of the first lead has a first portion that projects from the under surface of the resin sealing body, and a second portion that bends in a direction along the under surface of the resin sealing body from the first portion; and

the outer part of the second lead has a first portion that projects from the upper surface of the resin sealing body, and a second portion that bends in a direction along the upper surface of the resin sealing body from the first portion.

6. A semiconductor device according to claim 5, wherein

the second portion of the first lead has a portion of width wider than the first portion of the first lead; and

the second portion of the second lead has a portion of width wider than the first portion of the second lead.

7. A semiconductor device according to any one of claims 1-3, wherein

the supporting body is arranged as the main surface of the supporting body is situated along a height direction of the resin sealing body.

8. A semiconductor device according to any one of claims 1-3, wherein

the resin sealing body is formed in a cylinder shape which has an upper surface and an under surface including a plane, and a side surface including a curved surface.

9. A semiconductor device according to any one of claims 1-3, wherein

the resin sealing body is formed in a cylinder shape which has an upper surface and an under surface including a plane, and a side surface including a curved surface; and

the side surface of the resin sealing body has a plane in part.

10. A semiconductor device according to any one of claims 1-3,

wherein

the resin sealing body is formed in a cylinder shape which has an upper surface and an under surface including a plane, and a side surface including a curved surface; and

the side surface of the resin sealing body has a plane spaced out from the upper surface of the resin sealing body in part.

11. A semiconductor device according to claim 2 or 3, wherein

the semiconductor chip is adhered over the first supporting body via a first binding material;

the capacitative element is adhered over the first and the second supporting body via a second binding material; and

the first binding material includes material whose fusing point is higher than the second binding material.

12. A semiconductor device according to claim 2 or 3, wherein

the semiconductor chip is adhered over the first supporting body via a first binding material;

the capacitative element is adhered over the first and the second supporting body via a second binding material;

the first binding material includes a thermosetting material; and

the second binding material includes solder material.

13. A semiconductor device according to any one of claims 1-3, being built in an ignition device for mounting over a vehicle which operates an air bag based on a signal from an electronic control unit connected to an impact detection sensor.

14. A semiconductor device built in an ignition device for mounting over a vehicle which operates an air bag based on a signal from an electronic control unit connected to an impact sensor, comprising:

a semiconductor chip which has a main surface, a back surface which is an opposite side as the main surface, and a controlling circuit and a plurality of electrode pads formed over the main surface;

a capacitative element which has a first electrode and a second electrode;

a chip mounting part which has a first surface, and a second surface of an opposite side to the first surface;

a first through fourth lead that is a first through fourth lead arranged around the chip mounting part, and has a first surface and a second surface where each is mutually located in an opposite side, and with which the first surface is located in a same side as the first surface of the chip mounting part in a thickness direction of the chip mounting part;

a plurality of wires which connect electrically the electrode pads of the semiconductor chip, and each first surface of the first through fourth lead; and

a resin sealing body which seals the semiconductor chip, the capacitative element, the first through fourth lead, the wires, and the chip mounting part;

wherein

the first and the second lead extend and exist continuing in and out of the resin sealing body;

the semiconductor chip is arranged as facing the first surface of the chip mounting part; and

the capacitative element is arranged, as the first electrode of the capacitative element faces the second surface of the chip mounting part and the second electrode of the capacitative element faces the second surface of the third lead.

15. A semiconductor device according to claim 14, wherein

the first lead is a lead with which power supply potential is supplied and a control signal which controls the controlling circuit of the

semiconductor chip is supplied;

the second lead is a lead which outputs a control signal supplied from the semiconductor chip based on the control signal;

the third lead is a lead with which power supply potential is supplied from the semiconductor chip; and

the fourth lead is a lead which supplies a power supply potential outputted from the capacitative element to the semiconductor chip.

16. A semiconductor device according to claim 14, wherein

the two first leads are formed, one side is an anode, and another side is a cathode.

17. A semiconductor device according to claim 14, wherein

the fourth lead is connected with the chip mounting part, and a plurality of fourth leads are formed.

18. A semiconductor device according to claim 14, wherein

the semiconductor chip is being fixed to the chip mounting part via a binding material.

19. A semiconductor device according to claim 18, wherein

the binding material includes an insulating material.

20. A semiconductor device according to claim 18, wherein

the binding material includes a conductive material, and the back surface of the semiconductor chip is insulated to the chip mounting part.

21. A semiconductor device according to claim 14, wherein

the first electrode of the capacitative element is electrically connected with the chip mounting part; and

the second electrode of the capacitative element is electrically

connected with the third lead.

22. A semiconductor device according to claim 14, wherein

the capacitative element is being fixed to the chip mounting part via lead free solder.

23. A semiconductor device according to claim 22, wherein

the capacity of the capacitative element is 2.2□F.

24. A semiconductor device according to claim 14, wherein

the first lead and the second lead are mutually arranged bordering on the chip mounting part in a location of an opposite side.

25. A semiconductor device according to claim 14, wherein

the two first leads are formed; and

the third lead is formed between the first leads.

26. A semiconductor device according to claim 14, wherein

the fourth lead is arranged between the first lead and the second lead.

27. A semiconductor device according to claim 14, wherein

the resin sealing body has an upper surface, an under surface, and a side surface;

the chip mounting part and the first and the second lead are arranged along a height direction of the resin sealing body;

the first lead is projected from the under surface of the resin sealing body; and

the second lead is projected from the upper surface of the resin sealing body.

28. A semiconductor device according to claim 27, wherein

the first and the second lead has an inner part located in an inside of the resin sealing body, and an outer part located in an outside of the resin sealing body;

the outer part of the first lead has a first portion that projects from the under surface of the resin sealing body, and a second portion that bends in a direction along the under surface of the resin sealing body from the first portion; and

the outer part of the second lead has a first portion that projects from the upper surface of the resin sealing body, and a second portion that bends in a direction along the upper surface of the resin sealing body from the first portion.

29. A semiconductor device according to claim 28, wherein

Ag plating is performed to a portion of the inner part of each of the first and the second lead to which the wire is connected; and

Ni plating is performed to each second portion of the first and the second lead.

30. A semiconductor device according to claim 14, wherein

the wires are Au wires.

31. A semiconductor device according to claim 15, wherein

the two first leads are formed and one first lead supplies power supply potential lower than the first lead of another side.

32. A semiconductor device according to claim 15, wherein

the two second leads are formed and one second lead supplies power supply potential lower than the second lead of another side.

33. A manufacturing method of a semiconductor device, comprising

the steps of:

(a) preparing a semiconductor chip which has a main surface and a back surface which are mutually located in an opposite side, and a controlling circuit and a plurality of electrode pads which have been arranged in the main surface;

(b) preparing a capacitative element which has a first electrode and a second electrode;

(c) preparing a lead frame which has a first supporting body that has a main surface and a back surface which are mutually located in an opposite side, and a plurality of leads with which each has an inner part and an outer part, and each of the inner part has been arranged around the supporting body;

(d) adhering the semiconductor chip over the main surface of the first supporting body via a first binding material;

(e) connecting electrically the electrode pads of the semiconductor chip, and each inner part of the leads by a plurality of bonding wires;

(f) adhering the first electrode of the capacitative element over the back surface of the first supporting body via a second binding material; and

(g) forming a resin sealing body by performing resin seal of the semiconductor chip, the first supporting body, each inner part of the leads, and the bonding wires.

34. A manufacturing method of a semiconductor device according to claim 33, wherein

the lead frame has further a second supporting body that is the second supporting body arranged around the first supporting body, and has a main surface and a back surface which are mutually located in an opposite side and with which the main surface is located in a same side as the main surface of the first supporting body in a thickness direction of the first supporting body; and

the second electrode of the capacitative element is adhered over the

back surface of the second supporting body via the second binding material in the step (f).

35. A manufacturing method of a semiconductor device according to claim 33, wherein

the step (d) is carried out before the step (f); and

the first binding material includes material whose fusing point is higher than the second binding material.

36. A manufacturing method of a semiconductor device according to claim 33, wherein

the step (d) is carried out before the step (f);

the first binding material includes a thermosetting material; and

the second binding material includes solder material.

37. A manufacturing method of a semiconductor device according to claim 33, wherein

the step (f) is carried out after the step (e).

38. A manufacturing method of a semiconductor device according to claim 33, further comprising a step of bending and forming each outer part of the leads.

39. A manufacturing method of a semiconductor device according to claim 33, wherein

the resin sealing body is formed in a cylinder shape which has an upper surface and an under surface which includes a plane, and a side surface which includes a curved surface;

the leads have a first and a second lead;

as for the first lead, the outer part projects from the under surface of the resin sealing body; and

as for the second lead, the outer part projects from the upper surface of the resin sealing body.

40. A manufacturing method of a semiconductor device according to claim 33, wherein

the resin sealing body is formed in a cylinder shape which has an upper surface and an under surface including a plane, and a side surface including a curved surface; and

the first supporting body and the leads are arranged along a height direction of the resin sealing body.

41. A manufacturing method of a semiconductor device according to claim 33, wherein

the resin sealing body is formed in a cylinder shape which has an upper surface and an under surface including a plane, and a side surface including a curved surface.

42. An ignition device for mounting over a vehicle which operates an air bag based on a signal from an electronic control unit connected to an impact detection sensor, comprising:

a plurality of external terminals for an input which supply power supply potential and a control signal;

a sealing body which has a front surface and a back surface which are mutually located in an opposite side, and is arranged so that the back surface may face the external terminals for an input;

a firing element which has a main surface and a back surface which are mutually located in an opposite side, and is arranged over the front surface of the sealing body;

gunpowder arranged at the front surface side of the sealing body so that the firing element may be contacted; and

a case which stores the external terminals for an input, the sealing

body, the firing element, and the gunpowder;

wherein

the sealing body has a semiconductor chip and a capacitative element, and further the sealing body has a lead frame which is a platy lead frame which has a first surface and a second surface which are mutually located in an opposite side, and has a chip mounting part which fixes the semiconductor chip, and a plurality of lead terminals arranged around the chip mounting part; and

as for the chip mounting part, the first surface is perpendicularly arranged to the main surface of the firing element.

43. An ignition device according to claim 42, wherein

the sealing body has a first portion that is in contact with an inside of the case, and a second portion that is not in contact with an inside of the case; and

the first portion is located in the gunpowder side, and marking is performed to the second portion.